MARYLAND FISHERIES

PUBLISHED BY CONSERVATION DEPARTMENT OF MARYLAND

No. 31 BALTIMORE, MARYLAND November, 1934

CONTENTS

Page

DREDGE BOATS RESORT TO UPPER BAY ROCKS 1

PLATFORMS FOR GROWING AND CONDITIONING OYSTERS—By Dr. THURLOW C. NELSON, NEW JERSEY OYSTER INVESTIGATION LABORATORY —FROM "FISHING GAZETTE" 3

A NATIONAL FISH POLICY 7

CHESAPEAKE BAY FISHERIES—SPEECH BY SWEPSON EARLE AT "OUTDOOR LIFE CONVENTION" 9

TROUT HATCHING OPERATIONS BEGIN 13

DISTRIBUTION OF GAME FISH—JANUARY 1 TO OCTOBER 31, 1934 15

FISH COOKERY STUDIES 18

LOUISIANA'S CRAB INDUSTRY FORGES AHEAD 17

EDITORIAL

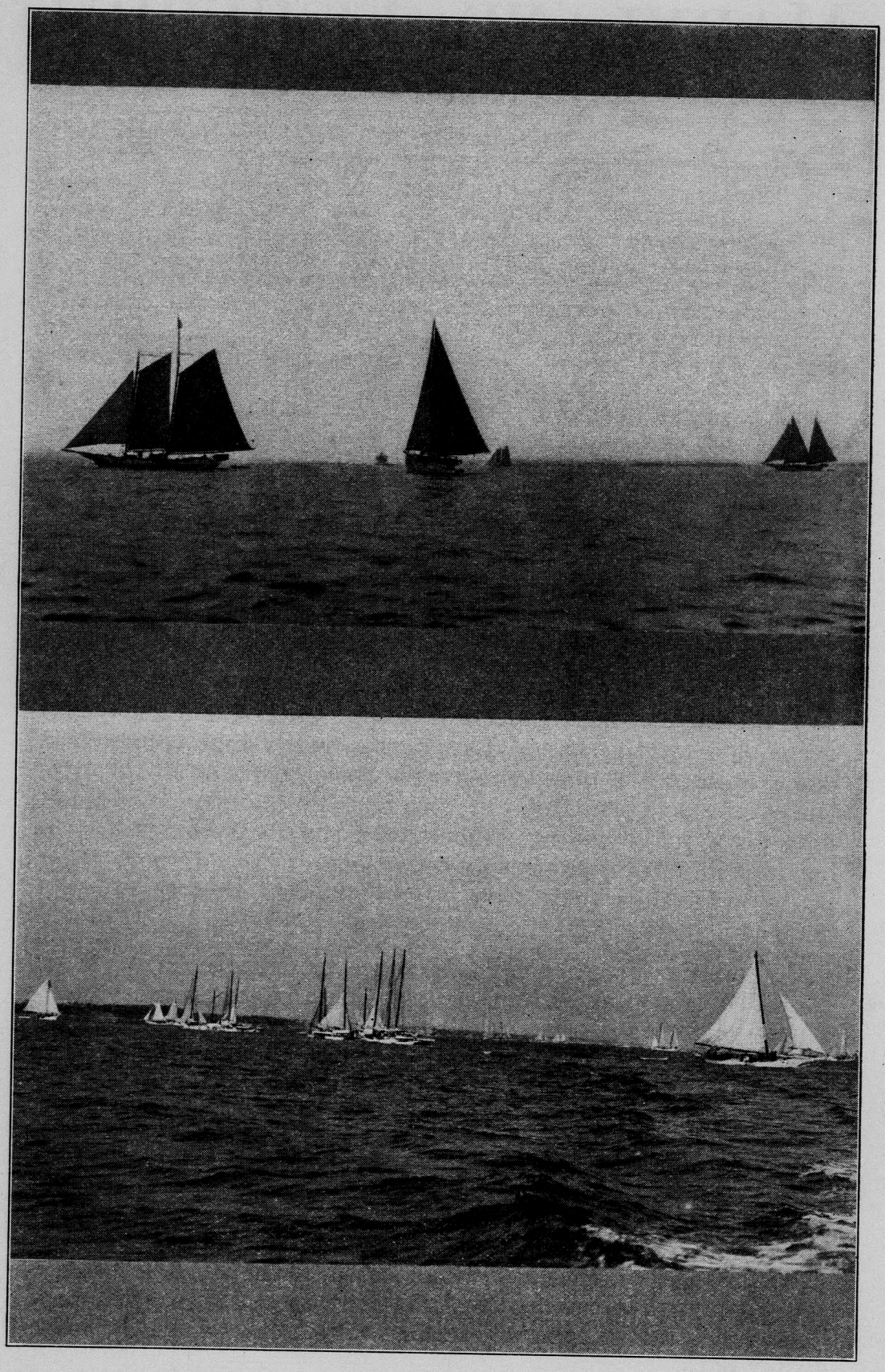
OYSTER CONDITIONS IN THE BAY 12

DREDGE BOATS RESORT TO UPPER BAY ROCKS

WITH the opening of the dredging season on November 1, the biggest aggregation of dredge boats for many years assembled on the upper Bay oyster rocks and commenced operations. On a number of these rocks, such as Snake Rip, the oysters are plentiful, but with such an abundance of small ones as to make culling difficult, and the Department had to bend all its efforts to prevent violations of the cull law. Buy boats and dredge boats alike were instructed that they would be promptly penalized if small oysters were taken.

Commissioner Swepson Earle, together with Chief Inspector E. O. Townsend and Chief Deputy Commander Amos Creighton, were present during the first day's operations. Since then the State Steamer McLane and several patrol boats have been stationed on the dredging grounds continuously.

The Conservation Department, realizing that is was necessary to have the cooperation of the oysters packers, sent a letter to each one, urging them to assist in the cull law enforcement by instructing their market boat captains not to take any but merchantable oysters. The majority of buy boats and dredgers have shown a willingness to cooperate, but others, seeking to evade the law, had not only to cull over their cargoes, but in some cases the entire cargo was returned to the oyster bars.



OYSTER DREDGING FLEET AT WORK ABOVE SANDY POINT, CHESAPEAKE BAY

PLATFORMS FOR GROWING AND CONDITIONING OYSTERS

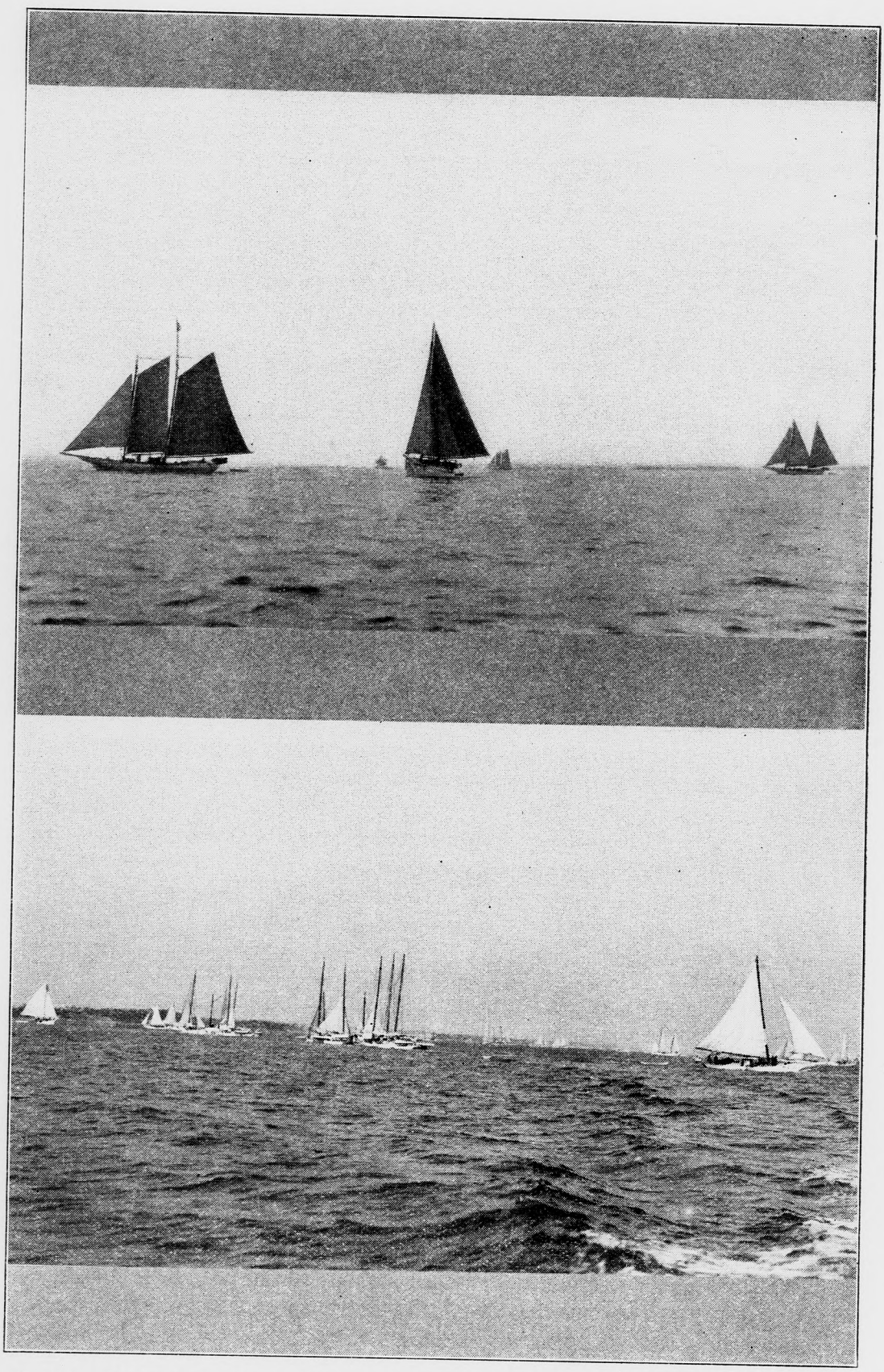
BY THURLOW C. NELSON, PH. D., *New Jersey Oyster Investigation Laboratory*

[*Editor's Note: Believing that some of our Maryland oyster farmers may be interested in Dr. Nelson's experiments and the experience of certain New Jersey growers who experimented with the platform method of oyster culture, the following article is reprinted from* Fishing Gazette]

PLATFORMS raised above the bottom on tidal flats have been used in oyster culture for more than half a century. The late Dr. Bashford Dean in the Bulletin of the United States Fish Commission for 1890 described the wide use of fixed trays for rearing seed oysters on the coast of France. Flattened boxes, 6 x 4 feet and 6 inches deep, with top and bottom of stout galvanized iron wire one to three meshes to the inch were fastened securely a few inches above the bottom by four corner posts. Young oyster seed removed from cement covered tiles were placed in the box and the wire lid fastened down. As high as 25,000 oysters were placed in each box, but during the first period of rapid growth it was necessary each fortnight to transfer some of the fastest growing young oysters to new trays. If tarred regularly once a year the trays were good for from 10 to 20 years. Advantages claimed for this system of culture were protection of the young oysters from shifting sand and from enemies, and rapid growth, in some instances, half an inch a month.

Once past the early growth period the oysters were better able to cope with sand and sediments or with enemies and were placed on the bottom in the opened bays or in enclosed basins or claires. Final fattening of adult oysters for market in France has been accomplished for more than half a century through laying out in claires in which heavy growths of a greenish blue diatom, *Nitschia ostrearum,* imparts both the flavor and the green color so highly esteemed by the French. Before shipping, the oysters are placed in brick or stone basins in clear water to allow extrusion of mud from the shell cavity.

In Australia oysters must be carried through from the earliest spat to marketable size while supported above the bottom due to the attacks of the mud worm. T. C. Roughley, in the Australian Museum Magazine, Vol. 2, 1925, and in the



OYSTER DREDGING FLEET AT WORK ABOVE SANDY POINT, CHESAPEAKE BAY

PLATFORMS FOR GROWING AND CONDITIONING OYSTERS

BY THURLOW C. NELSON, PH. D., *New Jersey Oyster Investigation Laboratory*

[*Editor's Note: Believing that some of our Maryland oyster farmers may be interested in Dr. Nelson's experiments and the experience of certain New Jersey growers who experimented with the platform method of oyster culture, the following article is reprinted from* Fishing Gazette]

PLATFORMS raised above the bottom on tidal flats have been used in oyster culture for more than half a century. The late Dr. Bashford Dean in the Bulletin of the United States Fish Commission for 1890 described the wide use of fixed trays for rearing seed oysters on the coast of France. Flattened boxes, 6 x 4 feet and 6 inches deep, with top and bottom of stout galvanized iron wire one to three meshes to the inch were fastened securely a few inches above the bottom by four corner posts. Young oyster seed removed from cement covered tiles were placed in the box and the wire lid fastened down. As high as 25,000 oysters were placed in each box, but during the first period of rapid growth it was necessary each fortnight to transfer some of the fastest growing young oysters to new trays. If tarred regularly once a year the trays were good for from 10 to 20 years. Advantages claimed for this system of culture were protection of the young oysters from shifting sand and from enemies, and rapid growth, in some instances, half an inch a month.

Once past the early growth period the oysters were better able to cope with sand and sediments or with enemies and were placed on the bottom in the opened bays or in enclosed basins or claires. Final fattening of adult oysters for market in France has been accomplished for more than half a century through laying out in claires in which heavy growths of a greenish blue diatom, *Nitschia ostrearum,* imparts both the flavor and the green color so highly esteemed by the French. Before shipping, the oysters are placed in brick or stone basins in clear water to allow extrusion of mud from the shell cavity.

In Australia oysters must be carried through from the earliest spat to marketable size while supported above the bottom due to the attacks of the mud worm. T. C. Roughley, in the Australian Museum Magazine, Vol. 2, 1925, and in the

Proceedings of the Linnaean Society of New South Wales, Vol. 51, 1926, describes and pictures elaborate series of platforms with wooden frames and wire netting bottoms upon which oysters are grown to maturity. In both the French and the Australian systems of culture, use is made of shore areas where the bottom is so soft that oysters placed directly on the mud would quickly smother. On the other hand, however, platforms can be used only where there is an appreciable rise and fall of the tide and where winter ice is not severe.

High Mortality and Overhead Require New Methods

Here in America with thousands of acres of excellent oyster grounds and with our high labor costs there has been little tendency to develop elaborate systems of oyster culture. Within the past year, however, the cultivation of oysters has taken on a new aspect. The tremendous toll of young oysters taken by enemies and by storms or adverse weather conditions, together with the availability of cheaper labor is turning the practical oyster grower in some areas toward systems of culture which will save a larger percentage of the crop planted and at the same time cut down overhead expenses. In Delaware Bay, New Jersey, seed oysters are obtained from the natural beds during May and June of each year. Owing to the depth and the roughness of the water, and to the state law which permits sail power only, dredging is carried on by large schooners. The best of these boats represent a cost of approximately $25,000 apiece, an investment which in many instances is gainfully employed only for six to eight weeks a year during the dredging season. The seed oysters planted by these boats have suffered severe destruction by drills or by drumfish, and during the hurricane in late August 1933 many thousands of bushels of oysters were covered by shifting of the bottoms. These misfortunes have turned the thoughts of some of the oyster producers toward possible new methods of culture.

Commercial Use of Platforms In New Jersey

Platforms were used for growing oysters in Little Egg Harbor, N. J., in 1919 by the New Jersey Oyster Investigation Laboratory. The good results of such a method were described in 1920 in the report of the New Jersey Agricultural Experiment Station, but evoked little interest among practical oyster growers. During the summer of 1933, Mr. J. R. Nelson put out a few bushels of large oysters on a small platform on the Delaware Bay shore of Cape May County at

Pierces, N. J. The oysters not only grew with unusual rapidity but threw out their spawn and fattened with excellent meats by the middle of August. From that time until cold weather these oysters far excelled in meats and in flavor oysters dredged from the open bay.

One important result of this experiment was the demonstration of the superior keeping quality of the oysters from this platform. A few oysters taken off early in October and kept at room temperature still retained their shell liquor at the end of 39 days. Owing to the shifting nature of much of the bottom of Delaware Bay, oysters tend to become deeply embedded. When dredged there is excessive breaking of the "bills" of the shells, resulting in rapid loss of shell liquor upon shipment. In a high proportion of the oysters the impact of the dredge drives sand between the shells before the oyster is able to close. Such oysters attempt by snapping of their shells to extrude the sand and thus lose their shell liquor.

Oysters taken from a raised platform not only have intact and water tight shells, but closing slowly with repeated snapping of the valves as the ebb tide exposes them, the oysters throw out mud and sand accumulated on the gills and mantle during feeding, and thus close finally in condition to stay shut if necessary for days.

Four New Jersey oyster planters encouraged by the results of this experiment undertook platform culture on a commercial scale during the late spring and the summer of 1934. Approximately 7,000 bushels of oysters were carried through the summer raised above a bottom so treacherous that as high as 75 per cent of large oysters planted thereon in the past sanded and died within two months. The oysters were from three main sources: Long Island Sound, Maurice River Cove, and from seed beds at the mouths of the streams entering Delaware Bay. Some of the last named, one and two years old, more than doubled in size in four months. Many of the larger oysters grew more than an inch during the summer. Elongated and misshapen oysters given freedom for growth greatly improved their appearance. Plans were laid to bring down approximately 25,000 bushels of small oysters from the mouths of nearby streams, but premature closing of these areas to protect the set of 1934 interfered.

Experience Indicates Improvements

Unfavorable results during the summer were the heavy set of spat upon the larger oysters, and the failure of the wooden

frames of the platforms through teredo attack. Protection against attachment of spat can be secured through putting out the oysters long enough before the setting period to enable them to acquire a coating of mud and of marine growths. Teredo attack can be prevented through the use of creosote or by coating the structures heavily with tar as practiced by the French.

The one inch chicken wire used for the bottoms of the platforms stretched enough under its load of oysters to reach the bottom at many points. Experiments will be conducted with "Rek-Tang" and other forms of woven wire in order to procure a bottom which will not stretch appreciably and which is heavy enough to last for several seasons. Wooden slats cut off water circulation and accumulate mud.

A modification of the platform, used during the past summer by Mr. J. R. Nelson, is a wire bottom tray small enough when filled with oysters to be handled easily by one man. The trays are set in a row upon two stringers fastened by stakes approximately half a foot above the bottom. The tray has two distinct advantages over the large platform: it can be loaded by the boats' crews while making the trip from the deep water beds to the shore, and the oysters can be placed in rows hinge downward, thus insuring opportunity for even growth of the shell, resulting in uniform and attractive-looking stock. In this position the oyster is actually "standing on its head" with its mouth at the lowest point. Oysters upon a natural reef or attached to the bottom ultimately grow into this posture if crowded. Insofar as the gathering of food by the oyster may be affected by gravity it would operate most favorably in bringing food strings into the mouth when the animal is standing hinge downward. Thus far, however, the evidence is that the bulk of the food material, and the degree to which it stimulates mucus secretion, are the chief factors making for acceptance or rejection of materials strained from the water by the gills.

We must not lose sight of the fact that the oyster has in the course of millions of years evolved as a reef animal, not as a bottom form like the clams. That oysters can be grown successfully on the bottom is our good fortune, but in many localities results are certain to be better when we institute a "back to nature" program and elevate the oyster above the shifting sands, the soft mud, and the enemies of the sea floor. Food conditions are usually better in such areas, making possible the production in a single growing season of a fat oyster of marketable size from a seed oyster. In this connection it

is of great interest to learn that Doctor Needler has during the past year achieved marked success in Prince Edwards Island in raising oyster spat in floating boxes where young starfish cannot reach them. We await further word from him with much interest.

Practical oyster growers will naturally ask how the building of expensive platforms is to result in lower costs of production. In many localities it will not, in others, through saving a much higher percentage of the seed, in producing a superior crop in less time, and in reducing sea going equipment, it will permit the oyster grower of moderate means to operate successfully through a changing period.

A NATIONAL FISH POLICY

AT the joint annual meeting of the International Association of Game and Fish Commissioners, and the American Fisheries Society, which took place in Montreal in the early autumn this year, United States Commissioner of Fisheries, Frank T. Bell, advanced what this Department considers the most progressive plan ever suggested by the Government for coordination of State and Federal efforts in the protection, propagation and conservation of the fishery resources of our country. Because of the fishery problems resulting from lack of coordinated action on the part of Virginia and Maryland in dealing with our own Chesapeake Bay fisheries, Conservation Commissioner Swepson Earle most enthusiastically endorses the Government's plan for a national fish policy. The plan proposes:

Operative organization: Five regional zones, composed of states having common fisheries problems, by geographic location. Each zone to have a zone chairman, and individual zone organization as deemed expedient. Zones to meet as often as practicable. Zone chairmen to meet twice each year with United States Commissioner of Fisheries, or as often as necessary. Annual meeting of all state fisheries officials comprising the National Planning Council.

Purpose: To coordinate Federal and State fisheries forces, and formulate a national fish policy.

Proposed program:

1. COOPERATIVE PROPAGATION AND DISTRIBUTION, to avoid duplication and overlapping of stocking efforts, to prevent

intermingling and mixing of species, to plan hatchery distribution, in states having both state and Federal hatcheries, at less cost to both the states and Federal Bureau.

2. POLLUTION PROGRAM. To work out a cooperative program to more effectively and judiciously expend money allotted for our important pollution projects, to combine surveys by states, and plan a national attack of this important problem.

3. STREAM SURVEYS AND IMPROVEMENTS. Formulation of a Federal and state program to coordinate the efforts of each in building up our streams and waterways.

4. SOIL EROSION AND REFORESTRATION. Formulation of a sound plan to combine the work being done by Federal and State agencies.

5. MARINE FISHERIES INVESTIGATION. Compilation of scientific data relative to marine fisheries, both commercial and sports fishing, looking toward the building up of our great commercial fishing industry. Program to include biological studies of breeding and feeding areas, habits, migration, practical methods of artificial propagation. Also, studies of simple methods of refrigeration to perfect a more inexpensive method of distribution, making it possible to open up a great fresh-fish market in the inland states.

6. COOPERATIVE STATISTICAL STUDIES. The Federal Bureau and the states can be of great help to each other in the collection and compilation of industries statistics through cooperation of our mutual facilities, thus reducing cost of operation in this important field.

7. COOPERATIVE SCIENTIFIC STUDIES. Cooperative use of facilities in scientific investigations.

8. COOPERATION WITH SPORTSMEN. Since angling is becoming increasingly popular, and more attention must necessarily be given to sports fishing problems by both Federal and State administrations, there are enumerable ways of cooperating in our efforts to better serve the sportsmen.

CHESAPEAKE BAY FISRERIES

By SWEPSON EARLE, *Conservation Commissioner* of Maryland

(Paper read before *Outdoor Life* Convention, on November 21, 1934)

IN the time allotted to me on a subject as broad as "Chesapeake Bay Fisheries," I can only speak briefly and in a general way, trusting to other speakers, who will discuss one or the other of our great water resources, to cover them in more detail.

Maryland has immense and varied natural advantages. Her Cheaspeake Bay and its many beautiful tributaries extending into the very heart of Maryland give us an enviable variety of scenery, and nature has blessed us with a store of natural wealth.

For many generations after the settlement of St. Mary's City, these blessings of nature were taken as a matter of course. They were used and often abused, and no thought was given to the possibility that the supply might be exhaustible. Had we had in Maryland as late as fifty years ago an organization such as is represented at this convention, our resources today would be sufficient for our needs and their future assured for coming generations. But "conservation", which has been almost an article of faith with me for so many years, has had, until recently, little actual meaning for the average man and woman. Until we were faced with the extinction of one wildlife form after another only indifference greeted the pleas of conservationists. The story of Chesapeake Bay's dwindling fishery resources is the story of the struggle for existence of all our wildlife. It is the hard and unequal struggle against ignorance, selfishness and indifference, and the greatest of these obstacles is indifference.

Taking the resources of Chesapeake Bay in the order of their importance, we come first to the oyster. This inoffensive bivalve has been the cause of more bitter fights in the legislative halls at Annapolis, more "political football" in the tidewater regions from whence it comes, more dissension and actual bloodshed among the watermen who harvest it than any other resource of our State. Indeed, Helen of Troy wrought no more havoc in her day than has the oyster during the past half century, and even today, when the word is mentioned before the General Assembly of Maryland instant attention is obtained.

In reviewing the history of the oyster industry of Maryland, we find that in 1885 nearly 900 dredge boats, averaging 10 men to a boat, led by fearless skippers, many of whom carried, shanghaied crews, ruled the waters of the Bay, working legally in the day time and at night raiding the tributary waters where dredging was prohibited. Many were the battles fought between the oyster police and the dredgers, when the latter were surprised in their illegal nocturnal practices. Today, the dredging fleet has shrunk to about 100 boats, and the rocks which, according to the records of 1885, yielded 15,000,000 bushels in a season now grudgingly yields a mere 2,000,000 bushels.

In all the years that oysters have been harvested for commercial purposes in Maryland, no systematic effort has been made until recently to replenish the declining supply, although evidences of that decline were apparent to thoughtful men as early as 1880. One such individual was the late Dr. William K. Brooks of the Hopkins, whose warnings that the supply was not inexhaustible and whose recommendations for its protection went largely unheeded until 1927. In that year the General Assembly of Maryland passed an act to provide funds for the rehabilitation of the depleted natural oyster bars by planting oyster shells.

Since that time, the Conservation Department has planted in the waters of the State approximately 6,000,000 bushels of shells and a large quantity of seed oysters. The result of this work has been an unmistakable increase in the production in certain tributary waters, which has been of great aid to many of our citizens who depend upon this fishery for their daily bread. The Department feels then that it may truthfully state that depletion has been stemmed, but to materially increase the production will require time and money. I think it is unreasonable to expect that our production will ever return to the high peak it reached in 1885 - 15,000,000 bushels. Indeed it is doubtful whether we should be able to successfully market so vast a crop, since we have long since lost our position as the leading oyster state and must now compete with the entire Atlantic and Gulf Coasts. No, increased production for Maryland must be gradual, and it must go hand in hand with more intelligent marketing methods.

All day Monday (November 19) I spent on the dredging rocks above Sandy Point, where the entire fleet of schooners, bugeyes and skipjacks is assembled because that is the only place for them to successfully operate in Chesapeake Bay. The oysters in this region are fat and are greatly in demand for the

Thanksgiving trade. Down the Bay on the Western Shore oysters are very thin, and this condition also prevails in a number of the tributaries. Had the Conservation Department not safeguarded this upper Bay region and prevented the wholesale catching of undersized oysters by the watermen, it would mean that 500 boatmen and from 1000 to 2000 shuckers and their families would be out of employment at this time, and many of them on relief.

The Chesapeake Biological Laboratory at Solomons Island, established in 1932 for the purpose of studying the problems connected with the marine life of Maryland, has a great field of service open to it. At the present moment a question of interest and importance to the industry is why oysters are fat in one locality and thin in another in the same season, and why oysters make rapid growth in a given locality one year and then virtually "stand still" for several succeeding years. These and similar questions face the oyster industry in Maryland, and also in Virginia, where conditions are much the same. The physical conditions of the waters of Chesapeake Bay are the same as they always were, according to Dr. R. V. Truitt, who has made extensive studies along this line, and its potentialities as great as ever.

The area known as the head of the Bay, north of Sandy Point, where seed oysters grow plentifully, gives us an opportunity during the early spring to transplant as much seed as the rocks will stand without injury, to certain bottoms down the Bay which produce large salty oysters. By carefully selecting the bottoms it may be possible to plant a quarter of a million bushels of seed annually, to close the area until the oysters become large enough to be marketed as Selects, and by this means assure the Maryland oyster packer of a supply of oysters from his own State comparable in quality to the oysters now imported from other states along the Atlantic Coast, notably Delaware.

There are conditions in the oyster industry that must be met when and as they arise. To delay action until the Legislature can pass upon them is often detrimental to the best interests of the industry. Therefore, it is of importance that broader powers should be given those in charge of the seafood resources. The Conservation Department at present has power to close certain oyster bars if conditions warrant it, and last year more than 5,000 acres were closed for a limited period, which gave the oysters a chance to develop and prevented their being taken and placed on the market at a time

(*Continued from Page* 19)

MARYLAND FISHERIES

PUBLISHED BIMONTHLY BY CONSERVATION DEPARTMENT,
SWEPSON EARLE, COMMISSIONER.

No. 31 BALTIMORE, MARYLAND November, 1934

OYSTER CONDITIONS IN THE BAY

THE INVESTIGATION by the Conservation Department of oyster rocks above Sandy Point made early in September indicated that this section would produce fat oysters by November.

Investigation below Sandy Point made in October showed oysters in this section poor and that unless a marked change occurred in their condition they would not be suitable for market until after the first of the next year, if then.

This information was passed along to the dredge boat captains, who were getting ready to begin operations November 1, with the result that practically the entire fleet of sailing craft assembled at the head of the Bay at the opening of the dredging season.

The Conservation Department realizes it has a big task before it in attempting to enforce the oyster laws and maintain order. The State steamer "Gov. R. M. McLane" with Chief Deputy Commander Amos S. Creighton was placed in charge of the operations, assisted by the police boats "Murray," "Folly" and "Calvert." Chief Inspector E. O. Townsend was also detailed to assist in this section.

It is fortunate that this area has received careful supervision by the Department in the past, which has resulted in a great quantity of oysters being left on the bottom. By actual count, there are employed now one hundred and three (103) dredge boats in this section as well as forty-five (45 market boats,) giving employment directly to six hundred and fifty (650) men. This, of course, does not include the employment given to shuckers in the packing houses, which may run from fifteen hundred (1500) to two thousand (2000).

The Conservation Department feels that the area above Sandy Point will have a great future both for merchantable

oysters and seed, the latter for the purpose of rehabilitating bars in other sections.

A marked change has taken place in conditions above Sandy Point since the construction of Conowingo Dam and the lowering of the C. and D. Canal to sea level. Prior to this change it was a common experience for freshets to destroy the oysters here, and there was no certainty that oysters left on the bottom one season would be alive the next season. All of this seems to be changed now, and such bars as Sandy Point, Love Point, Snake Rip, the Lumps east of Craighill Channel as well as Bodkin, are producing merchantable oysters of a better grade than for a number of years.

Undoubtedly this area has greatly helped the packers in providing a supply of oysters badly needed to fill Thanksgiving orders.

TROUT HATCHING OPERATIONS BEGIN AT LEWISTOWN

A. M. POWELL, Superintendent of the Conservation Department's game fish hatcheries, reports that spawn will be taken from his brood stock of brook trout at Lewistown during this month (November) and December and incubated; later to be placed in rearing ponds at Lewistown, Ritchie Camp, Cushwa Springs and elsewhere.

He reports also that there is on hand at Lewistown for distribution for the 1935 fishing season 18,000 eight to twelve inch brook and rainbow trout. These trout are placed in the streams of Frederick, Baltimore and other counties east of Frederick at intervals during the trout-fishing season. It has been found advisable to do this several times during the season, instead of stocking once just ahead of the season, as was formerly done. By repeated stockings a uniform supply of fish is maintained during the entire season.

There are also on hand at Lewistown (in rearing ponds):

48,000—5 to 6 inch trout which will have attained a suitable size for 1936 season.
5,000—6 to 8 inch trout also to be reared for 1936 season.
8,000—4 to 6 inch brown trout, some of which will be liberated in 1935.
1,000 adult brook trout, from which spawn is taken.

The United States Bureau of Fisheries is supplying the State with 150,000 brown trout eggs, which will be incubated and reared until sufficiently large for placing in those streams

of Maryland which are suitable for this fish. Brown trout can survive in waters where brook trout cannot, as they can stand higher water temperatures. Certain Baltimore County streams are admirable for this fish, which is much sought after by many anglers.

In November, 1933, the State purchased 16 acres of land adjacent to the Lewistown hatchery for the construction of ponds for the propagation of small-mouth black bass. The construction of the banks of these ponds was done by the Department's own employes, while all the grading, leveling and finishing up was done by Civilian Conservation Corps workers from Fishing Creek Camp No. 57. Approximately 6 months were consumed in this operation, and considerable money was saved the Department by the utilization of this labor. Ten ponds (covering 6 acres) are completed for the 1935 operations. The ponds are 50 feet wide and 200 feet long, and vary in depth from 2 to 4 feet. Each pond has an inlet and outlet, making it a complete and separate unit, and the construction is according to the latest and most scientific method of bass rearing.

TROUT PLACED IN DEEP CREEK LAKE

On November 1 and 2, the Department placed in Deep Creek Lake, Garrett County, about 4,000 brook trout, which have been reared at the Bear Creek hatchery, about 12 miles from the lake, near the town of Friendsville. These fish, according to Warden Elmer Haulenbeek, who had charge of the planting, were 10 and 11 inches in length, and in excellent condition. Ralph W. Miller, fish culturist at Bear Creek station reports that about 700 trout, which escaped at the time those taken for the Lake were being caught in seines, were later turned out into Bear Creek, which is one of the important trout streams of Garrett County.

The streams of this county are being fished by Allegany County anglers in increasing numbers every year, because of the almost total lack of good trout streams in the latter county. This year, because of drought conditions which prevailed during the winter and spring seasons, the streams of Garrett County have been very low, and Deep Creek Lake itself has never been so low as it was during the past summer.

DISTRIBUTION OF ADULT GAME FISH FROM JAN. 1 TO OCT. 31, 1934.

	Number Adults	
Anne Arundel County—*Brook Trout*:		
Severn Run	1,000	
Stoney Run	1,300	
Furnace Branch	550	
Sawmill Branch	200	
Deep Run	300	
Piney Run	200	
	3,550	
Baltimore County:		
Baisman Run	1,100	
Counsilman Run	1,000	
Delaware Run	400	
Western Run	1,200	
Piney Run	100	
	3,800	
Carroll County:		
Snowden Run	600	
Cecil County:		
Mill Creek	300	
Perryville Reservior	500	
	800	
Frederick County:		
Big Hunting Creek	5,300	
Fishing Creek	10,100	
Fishing Creek	7,000	*4
Little Owens Creek	600	
Turkey Run	300	
Lake Cascade	730	
Tuscarora	1,000	
Tuscarora	6,000	*4
	31,030	
Rainbow Trout:		
Fishing Creek	5,700	
Little Owens Creek	200	
Big Hunting Creek	5,400	
Little Hunting Creek	600	
	11,900	
Garrett County—*Brook Trout*:		
Bear Creek	6,764	
Salt Block	500	
Little Youghiogheny	500	
White Rock	500	
Savage River	2,000	
Herrington Creek	500	
Cherry Creek	500	
Dunkard Run	500	
Turner Run	100	
School House Run	200	
Deep Creek Lake	3,000	
Spiker Run	150	
Mill Run	250	
Laurel Run	250	
Mill Run	100	
Rainbow Trout:		
Deep Creek Lake	3,800	
	19,514	

* Indicates size of fish in inches.

	Number Adults	
Harford County—*Brook Trout*:		
Mine Branch	500	
Goad Stream	150	
Elbow Branch	400	
	1,050	
Conowingo Lake—large mouth bass	60,000	*1½
Conowingo Lake—blue gills	110,000	*2-3
Conowingo Lake—large mouth bass	1,000	
	171,000	
Howard County—*Brook Trout*:		
Patuxent River	350	
Washington County:		
St. James Run	1,100	
Little Conocheague	1,500	
Rainbow Trout:		
Tonolaway Creek	500	
Marsh Run	1,300	
St. James Run	2,600	
Simples Run	300	
Little Conocheague	2,500	
Lake Woodmont	200	
	10,000	

* Indicates size of fish in inches.

Heretofore the distribution year of Division of Fish Culture was from January 1 to December 31. As the Department's fiscal year is from October 1 to September 30, this is shown to correspond with the fiscal year ending September 30.

GOVERNMENT LABORATORY MOVED TO UNIVERSITY OF MARYLAND

Cooperative research by the United States Bureau of Fisheries and the University of Maryland was recently undertaken when the Division of Fishery Industries established chemical and nutritional laboratories at College Park. It is thought that the studies to be carried on at this station will be of great importance to the development of the fisheries of Chesapeake Bay. As its share in the cooperative program, the University of Maryland is providing space, rent-free, telephone, water, lights, gas and janitor service. Charles F. Lee, junior chemist, and S. F. Mason, laboratory assistant, have been transferred to College Park to carry on the work.

LOUISIANA'S CRAB INDUSTRY FORGES AHEAD

MARYLAND crab packers and shippers will probably be interested and surprised to learn that the blue-crab industry in Louisiana is the third most important fishery of a state rich in fishery products, and that it is growing rapidly. Records of the Department of Conservation, as published in the *Louisiana Conservation Review,* give the production for 1933 as follows:

768,000 dozen hard crabs—value	$115,000
132,000 dozen soft crabs—value	100,000
1,800,000 pounds crab meat—value	362,000
Total value (wholesale)	$577,000

In an industry that is of comparatively recent origin these figures show an extremely promising future. Joseph L. Fisher, of Morgan City, La., who operates a crab meat packing plant in that city, states:

"Crab meat is the industry that promises to be the major one in this section in the near future. The first establishment was opened here a few years ago in a small way by a New Orleans distributor who has gradually enlarged his plant and increased his workers until he now employs about 50 men and women. Today there are eight such concerns in Morgan City and Berwick, providing employment for 600 people.

"Some doubt was expressed for a time whether there would be enough crabs to maintain the plants in continuous operation, but this doubt has now been eliminated by the string of boats on the Gulf coast fishing salt-water crabs. Perhaps a hundred men are now employed fishing crabs in the 'outside' waters, mixing the salt-water crabs with the fresh-water catch.

"The crab meat is shipped daily to all sections of the United States in large and small quantities. On the books of local packers may be found standing orders from many of the leading hotels of the United States. There is an *established demand* in the United States for 19,000,000 pounds of crab meat per annum, and it is necessary to import 63 per cent or 12,000,000 pounds. Besides crab meat, 126,000,000 pounds of oyster meat and 102,000,000 pounds of shrimp meat are consumed annually in this country. Many fish dealers here are shipping fresh-water fish and frogs over the entire country. Recently cold storage facilities have been established, and with this addition to the industry, surplus stocks can now be safely put away, preventing losses of these perishable products."

Maryland crab packers may soon find that they have a formidable rival in Louisiana, and evidently the sea-food dealers of the Kingfish's State are not afraid of overproduction, as some of our Chesapeake Bay (notably Virginia) packers seem to be. They apparently see the vast potential market of the United States, and are going after it, not being satisfied to confine their shipments to nearby markets.

FISH COOKERY STUDIES

INFORMATION received from U.S. Bureau of Fisheries indicates that a program of fish-cookery studies has recently been inaugurated by the Division of Fishery Industries of the Bureau. From this work simple recipes for cooking fish will be assembled and published in a small book on fish-cookery for general distribution in an educational campaign which the Division expects to undertake shortly. It is believed that studies of this kind will be of great value to the fishery industry and to the consumer. The consumer will benefit in that he will be taught better methods of preparing and cooking fish in the home, and will be better instructed as to the unexcelled nutritive value of fish and fishery products. The industry will benefit by the expected increased consumption of fish as a result of this campaign.

The members of the Division's technological staff engaged in this work are Norman D. Jarvis and Miss Agnes I. Webster. The book of recipes will not exceed 18 pages and will cost in the neighborhood of 5 cents a copy, or probably 2 to 3 cents for quantity orders.

The Bureau of Fisheries believes that in undertaking this educational campaign it is initiating a type of service which is badly needed by the industry and by the consumer, because of the general ignorance on the part of the public as to the great importance of our commercial fisheries as a source of food. For many years the Department of Agriculture has conducted an extension or educational service in agricultural food products to the great benefit of the American farmer and the public, or general consumer. This service to the fisheries has been notably lacking.

To illustrate the lack of knowledge on the part of the consumer regarding fishery products, an examination of our statistical records shows that, although there are 160 edible varieties of fish taken in this country on a commercial scale,

only about 12 of these varieties account for 80 per cent of the volume of consumption. It is this situation which the Bureau of Fisheries hopes its educational campaign will remedy. Should this service prove desirable and successful, the Bureau hopes to secure further funds for such work, as present funds for this purpose are limited.

Along this line, it is interesting to note a similar effort has been successfully launched in Germany. Friday is the big fish-eating day of the week in that country, as it is here, but a German regulation (according to a story appearing in *Fishing Gazette*) names Tuesday as an additional fish-eating day in each week. Hotels, restaurants, institutions, and the German people generally, to be law-abiding, or patriotic, must serve fish every Tuesday. In order to teach the villagers in the interior the value of fish, a Government motor-car, completely staffed and fitted, tours the country as a travelling school of sea-fish cookery. The car is a 6 ton, 40 feet long automobile, with its own power plant for supplying ten cooking rings and four frying basins. Each day the car halts before the girls' schools in different small towns and villages and the girls are put through an intensive course of short lectures and practical cooking. There is a show window in the car in which are exhibited all kinds of fresh and dried sea fish and people are encouraged to purchase these and have them cooked on the spot. It is said the car pays its way in this manner and also appears to be carrying on successful propaganda work for the fishery industry of Germany.

CHESAPEAKE BAY FISHERIES

(*Continued from Page* 11)

when they would have brought very little. Proper marketing of a fishery crop is just as important as raising the crop, and unfortunately, too little thought has been given to this feature in the past, resulting in much loss to our citizens.

The second great fishery product of Chesapeake Bay is the blue crab, about which Dr. R. V. Truitt of the University of Maryland will address you later in the day. I wish merely to touch briefly on the fight Maryland has been making for the past 15 years to protect this fishery. Because the crab requires the whole of Chesapeake Bay for its development, Virginia shares with Maryland the responsibility for the future of this seafood. Indeed, the key to the perpetuation

of the supply lies wholly with Virginia, because the female crab pregnant with eggs migrates to the salty water of the Virginia Capes to hatch out her young, and unless the crab in this stage is protected by Virginia, Maryland is helpless to deal with the situation. As early as 1916, it was apparent to me that the supply of this valuable crustacean was dwindling, and from that time until 1926 innumerable conferences were held with the Virginia authorities, and at every session of their General Assembly, delegations from Maryland appeared to plead the passage of protective legislation for the egg-bearing female or sponge crab as it is called.

Although few sponge crabs are found in Maryland waters, our Legislature had already passed a law forbidding the catching of this crab, and we felt that we could, with great justice demand that Virginia do likewise. Finally in 1926, after many stormy sessions, the Virginia Assembly did pass a law protecting the female crab bearing the egg sponge at all times in her waters.

Almost immediately an increase in the crab supply of the upper Bay was observed. In 1925, one year before the passage of this legislation, the production of the Bay had been 29,000,000 pounds of crabs. In 1931 - five years afterward - the production had jumped to 68,000,000 pounds, and upper Bay points like Rock Hall and Kent Island developed a remarkable crab business where previously there had been almost none.

Then came reports of dissatisfaction from Virginia crab packers, particularly those in the region of Hampton. These packing interests claimed that crabs were too plentiful to be handled at a profit, and they advocated a repeal of the sponge crab act. In 1931, therefore, over the strenuous protests of Maryland, backed by the scientists of the U. S. Bureau of Fisheries, the Virginia Legislature voted to amend the sponge crab law by permitting the destruction of the crab in this stage during the months of April, May and June, the peak of the spawning season. The result has been that Maryland during the past summer experienced a great shortage in the crab supply, and will continue to feel this shortage so long as our sister State permits the wanton destruction of the sponge crab. However, the NRA. crab code has in it a provision that this crab shall be protected in the entire Chesapeake Bay, and if enforced, we may hope for a uniform supply.

Eighty per cent of those present, I feel, are more interested in the fin fish of the Chesapeake than in any of the other re-

sources of our Bay. Here the Department feels that it can view the situation with optimism, as certain varieties of our salt-water fishes are undoubtedly on the increase. During the past season the reports reaching us from commercial fishermen and anglers alike have been to the effect that sea-trout and tailor (the well-known bluefish) have been plentiful. During a visit to one of the tributaries of the Western Shore in September, quantities of young tailor were observed pursuing the menhaden which were present in the river in large schools. In this connection, it is felt that Maryland's wisdom in preventing the catching of menhaden for fertilizer is responsible for the increase in certain varieties of our more desirable fish, notably the tailor and striped bass, which are known to feed on menhaden.

In speaking of the striped bass, which has a limited zone of migration in the Bay, the scarcity of this fish has been a source of much regret to our salt-water fishermen. However, reports received last month by the Conservation Department indicate a large supply of small rock or striped bass, which promises well for the future supply in the Potomac as well as the upper Bay.

If we are to perpetuate our present fish supply we must seek further control of destructive types of fishing gear. The curtailment of nets in the lower Bay in Virginia is of the utmost importance if that great national fish, the shad, which visits our waters every spring, is to survive.

At the Montreal meeting of the International Association of Game, Fish and Conservation Commissioners and the American Fisheries Society, Mr. Frank T. Bell, U. S. Commissioner of Fisheries, advanced what I believe to be one of the most progressive plans ever launched by the Government for the protection of the country's fishery resources. At this meeting he proposed that a National Fish Policy be formulated to coordinate Federal and State efforts in fishery protection, propagation and conservation, such a policy to include reforestation, prevention of pollution and other allied subjects. With the fishery authorities and leading conservationists of the country committed to such a program, backed by the Federal Government, refractory states and selfish interests can be whipped into line, and I, for one, am wholeheartedly in favor of the plan.

In closing my remarks, I wish to say that my greatest inspiration during the years I have been connected with conservation work in Maryland has come from the interest and

cooperation of organizations which would see the fisheries and wildlife of our State perpetuated. These groups have done excellent work in the localities in which they have been established, and a yearly meeting such as the present Out-Door Life Convention will be a tremendous force in awakening public interest in our great outdoors and in the importance of maintaining the beauty and natural wealth which is still so abundantly ours.